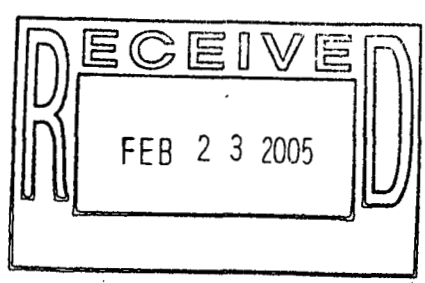
Environmental Restoration
RFCA Standard Operating Protocol
for Routine Soil Remediation
FY05 Notification #05-02
IHSS Group 500-3

Approval received from the Colorado Department of Public Health and Environment
February 10, 2005

Approval letter contained in the Administrative Record.



February 2005

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ACRONYMS

AL	action level
bgs	below ground surface
BMP	best management practice
BZ	buffer zone
CDPHE	Colorado Department of Public Health and Environment
COC	contaminant of concern
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
EDDIE	Environmental Data Dynamic Information Exchange
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation
ft	foot
ft^2	square foot
FY	Fiscal Year
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IABZSAP	Industrial Area and Buffer Zone Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
MDL	method detection limit
nCi/g	nanocuries per gram
NPWL	New Process Waste Lines
OPWL	Original Process Waste Lines
PA	Protected Area
PAC	Potential Area of Concern
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PCOC	potential contaminant of concern
pdf	portable document format
POC	Point of Compliance
POE	Point of Evaluation
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS or Site	Rocky Flats Environmental Technology Site
RL	reporting limit
RSOP	RFCA Standard Operating Protocol
SAP	Sampling and Analysis Plan
SSRS	Subsurface Soil Risk Screen
UBC	Under Building Contamination
VOC	volatile organic compound
WRW	wildlife refuge worker

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1.0 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2004a) Fiscal Year 2005 (FY05) Notification includes the notification to remediate Individual Hazardous Substance Sites (IHSSs), Under Building Contamination (UBC) sites, and Potential Areas of Concern (PACs) at the Rocky Flats Environmental Technology Site (RFETS or Site) Industrial Area (IA) during FY05. The purpose of this Notification is to invoke the ER RSOP for IHSS Group 500-3. Activities specified in the ER RSOP are not reiterated here; however, deviations from the ER RSOP are included where appropriate.

Soil with contaminant concentrations greater than the RFCA wildlife refuge worker (WRW) action levels (ALs), or as indicated by the Subsurface Soil Risk Screen (SSRS), and associated debris will be removed in accordance with RFCA (DOE et al. 2003) and the ER RSOP (DOE 2004a).

The location of IHSS Group 500-3 is shown on Figure 1, and the currently identified areas requiring remediation under ER RSOP Notification #05-02 are listed in Table 1 along with potential contaminants of concern (PCOCs) and the estimated remediation volume. The PCOCs were determined based on process knowledge and data collected during previous studies (DOE 1992-2003; 2001; 2000). In accordance with IA Sampling and Analysis Plan (SAP) (IASAP) Addendum #IA-03-12 (DOE 2003a), accelerated action soil samples were collected throughout IHSS Group 500-3 and analyzed for the appropriate PCOCs.

Table 1
Potential Remediation Areas for IHSS Group 500-3

IHSS Group	IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume (cubic yards)
500-3	UBC 559 – Building 559	Radionuclides Metals VOCs	Surface and Subsurface Soil	10

2.0 IHSS GROUP 500-3

IHSS Group 500-3 includes the following IHSSs, PACs, and UBCs. These locations are shown on Figures 2 and 3.

- UBC 559, Building 559 Service Analytical Laboratory;
- UBC 528, Temporary Waste Holding Building;
- IHSS 500-159, Radioactive Site Building 559; and

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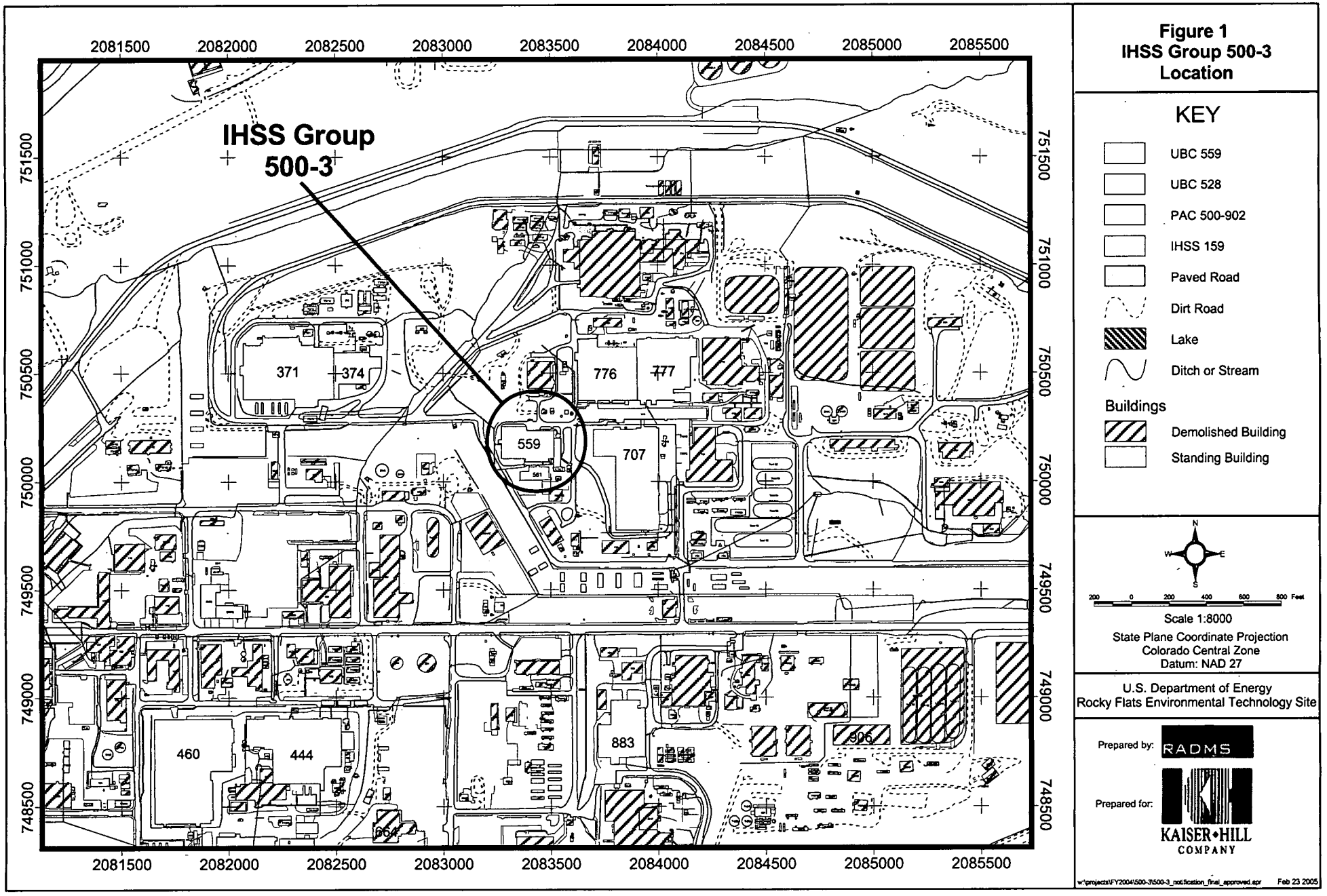
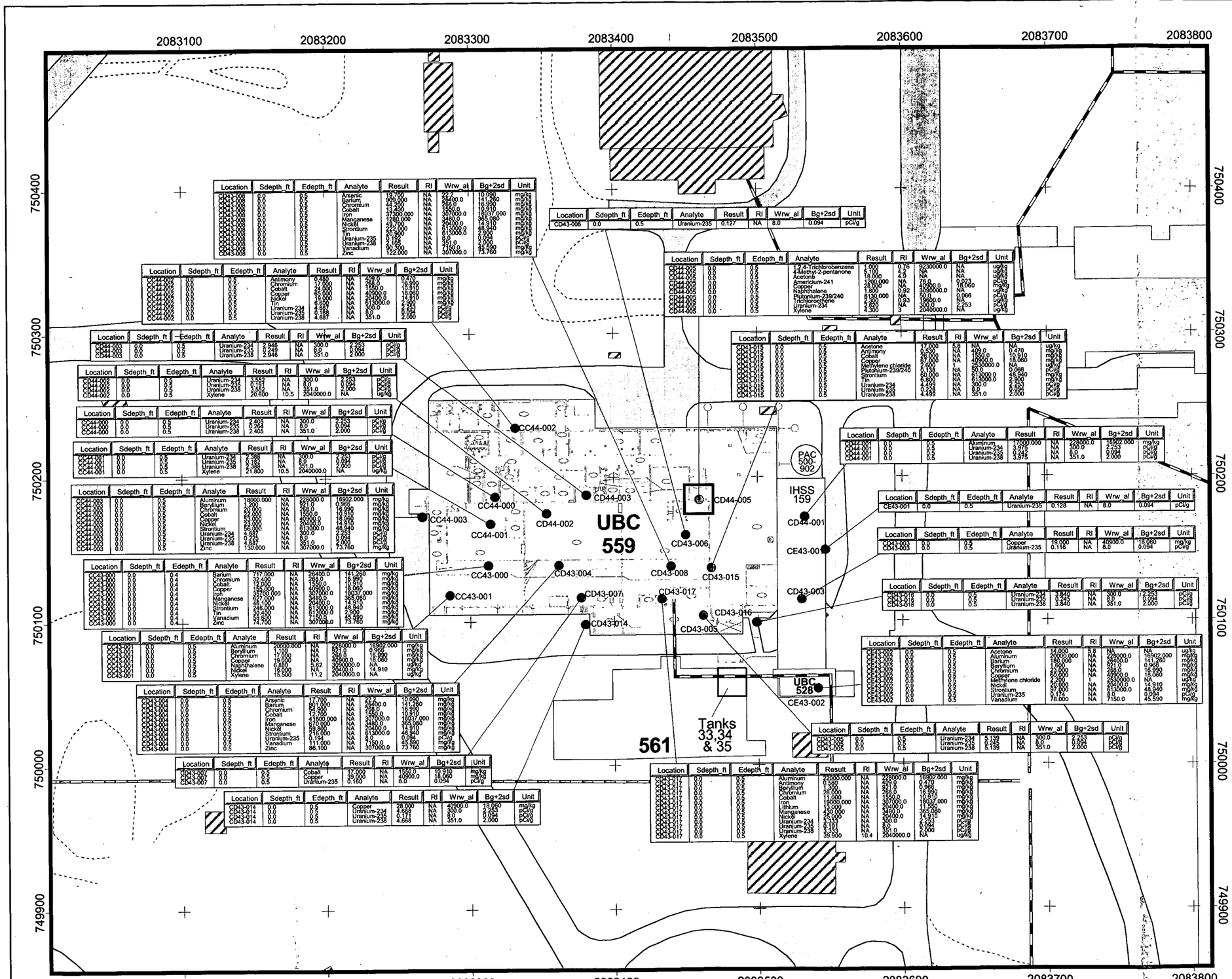

IHSS Group
500-3
2081500
2082000
2082500
2083000
2083500
2084000
2084500
2085000
2085500
751500
751000
750500
750000
749500
749000
748500
371
374
776
777
559
707
460
444
883
906
Figure 1
IHSS Group 500-3
Location
KEY
UBC 559
UBC 528
PAC 500-902
IHSS 159
Paved Road
Dirt Road
Lake
Ditch or Stream
Buildings
Demolished Building
Standing Building
N
W
E
S
200 0 200 400 600 800 Feet
Scale 1:8000
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27
U.S. Department of Energy
Rocky Flats Environmental Technology Site
Prepared by: RADMS
Prepared for: KAISER•HILL COMPANY
w:\projects\FY2004\500-3\500-3_notification_final_approved.apr Feb 23 2005

Figure 2
IHSS Group 500-3 Surface Soil Results Greater Than RLs or Background Means Plus Two Standard Deviations



Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-008	0.0	0.5	Arsenic	19.700	NA	22.2	10.090	mg/kg
CD43-008	0.0	0.5	Barium	906.000	NA	26400.0	141.260	mg/kg
CD43-008	0.0	0.5	Chromium	44.300	NA	268.0	16.990	mg/kg
CD43-008	0.0	0.5	Cobalt	13.400	NA	1550.0	10.910	mg/kg
CD43-008	0.0	0.5	Iron	37300.000	NA	307000.0	18037.000	mg/kg
CD43-008	0.0	0.5	Manganese	1240.000	NA	3480.0	365.060	mg/kg
CD43-008	0.0	0.5	Nickel	48.700	NA	204000.0	14.910	mg/kg
CD43-008	0.0	0.5	Strontium	222.000	NA	613000.0	48.940	mg/kg
CD43-008	0.0	0.5	Tin	50.900	NA	61300.0	2.900	mg/kg
CD43-008	0.0	0.5	Uranium-235	0.192	NA	8.0	0.094	pCi/g
CD43-008	0.0	0.5	Uranium-238	1.106	NA	351.0	2.000	pCi/g
CD43-008	0.0	0.5	Vanadium	90.500	NA	7150.0	45.590	mg/kg
CD43-008	0.0	0.5	Zinc	122.000	NA	307000.0	73.760	mg/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-006	0.0	0.5	Uranium-235	0.127	NA	8.0	0.094	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD44-005	0.0	0.5	1,2,4-Trichlorobenzene	1.000	0.76	9230000.0	NA	ug/kg
CD44-005	0.0	0.5	4-Methyl-2-pentanone	9.100	4.9	NA	NA	ug/kg
CD44-005	0.0	0.5	Acetone	18.000	4.9	NA	NA	ug/kg
CD44-005	0.0	0.5	Americium-241	1280.000	NA	78.0	0.060	pCi/g
CD44-005	0.0	0.5	Copper	28.000	NA	40900.0	18.060	mg/kg
CD44-005	0.0	0.5	Naphthalene	1.800	0.92	3090000.0	NA	ug/kg
CD44-005	0.0	0.5	Plutonium-239/240	8130.000	NA	50.0	0.066	pCi/g
CD44-005	0.0	0.5	Trichloroethene	2.200	0.33	19600.0	NA	ug/kg
CD44-005	0.0	0.5	Uranium-234	2.600	NA	300.0	2.253	pCi/g
CD44-005	0.0	0.5	Xylene	4.300	3	2040000.0	NA	ug/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD44-002	0.0	0.5	Antimony	0.480	NA	409.0	0.470	mg/kg
CD44-002	0.0	0.5	Chromium	17.700	NA	268.0	16.990	mg/kg
CD44-002	0.0	0.5	Cobalt	24.000	NA	1550.0	10.910	mg/kg
CD44-002	0.0	0.5	Copper	65.000	NA	40900.0	18.060	mg/kg
CD44-002	0.0	0.5	Nickel	59.800	NA	204000.0	14.910	mg/kg
CD44-002	0.0	0.5	Tin	6.600	NA	61300.0	2.900	mg/kg
CD44-002	0.0	0.5	Uranium-234	4.691	NA	300.0	2.253	pCi/g
CD44-002	0.0	0.5	Uranium-235	0.189	NA	8.0	0.094	pCi/g
CD44-002	0.0	0.5	Uranium-238	4.687	NA	351.0	2.000	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD44-003	0.0	0.5	Uranium-234	2.946	NA	300.0	2.253	pCi/g
CD44-003	0.0	0.5	Uranium-235	0.219	NA	8.0	0.094	pCi/g
CD44-003	0.0	0.5	Uranium-238	2.946	NA	351.0	2.000	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD44-004	0.0	0.5	Uranium-234	2.552	NA	300.0	2.253	pCi/g
CD44-004	0.0	0.5	Uranium-235	0.161	NA	8.0	0.094	pCi/g
CD44-004	0.0	0.5	Uranium-238	2.462	NA	351.0	2.000	pCi/g
CD44-004	0.0	0.5	Xylene	20.600	10.5	2040000.0	NA	ug/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CC44-000	0.0	0.5	Uranium-234	2.405	NA	300.0	2.253	pCi/g
CC44-000	0.0	0.5	Uranium-235	0.164	NA	8.0	0.094	pCi/g
CC44-000	0.0	0.5	Uranium-238	2.405	NA	351.0	2.000	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CC44-001	0.0	0.5	Uranium-234	2.388	NA	300.0	2.253	pCi/g
CC44-001	0.0	0.5	Uranium-235	0.182	NA	8.0	0.094	pCi/g
CC44-001	0.0	0.5	Uranium-238	2.388	NA	351.0	2.000	pCi/g
CC44-001	0.0	0.5	Xylene	21.800	10.5	2040000.0	NA	ug/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CC44-003	0.0	0.5	Aluminum	18000.000	NA	228000.0	16902.000	mg/kg
CC44-003	0.0	0.5	Beryllium	1.200	NA	521.0	0.962	mg/kg
CC44-003	0.0	0.5	Chromium	24.000	NA	268.0	16.990	mg/kg
CC44-003	0.0	0.5	Cobalt	13.000	NA	1550.0	10.910	mg/kg
CC44-003	0.0	0.5	Copper	43.000	NA	40900.0	18.060	mg/kg
CC44-003	0.0	0.5	Iron	31400.000	NA	307000.0	18037.000	mg/kg
CC44-003	0.0	0.5	Nickel	58.000	NA	204000.0	14.910	mg/kg
CC44-003	0.0	0.5	Strontium	213.000	NA	613000.0	48.940	mg/kg
CC44-003	0.0	0.5	Uranium-234	4.691	NA	300.0	2.253	pCi/g
CC44-003	0.0	0.5	Uranium-235	0.189	NA	8.0	0.094	pCi/g
CC44-003	0.0	0.5	Uranium-238	4.687	NA	351.0	2.000	pCi/g
CC44-003	0.0	0.5	Zinc	130.000	NA	307000.0	73.760	mg/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CC43-000	0.0	0.4	Barium	717.000	NA	26400.0	141.260	mg/kg
CC43-000	0.0	0.4	Chromium	32.400	NA	268.0	16.990	mg/kg
CC43-000	0.0	0.4	Cobalt	14.000	NA	1550.0	10.910	mg/kg
CC43-000	0.0	0.4	Copper	1570.000	NA	40900.0	18.060	mg/kg
CC43-000	0.0	0.4	Iron	27000.000	NA	307000.0	18037.000	mg/kg
CC43-000	0.0	0.4	Manganese	627.000	NA	3480.0	365.060	mg/kg
CC43-000	0.0	0.4	Nickel	46.100	NA	204000.0	14.910	mg/kg
CC43-000	0.0	0.4	Strontium	248.000	NA	613000.0	48.940	mg/kg
CC43-000	0.0	0.4	Tin	92.400	NA	61300.0	2.900	mg/kg
CC43-000	0.0	0.4	Vanadium	58.600	NA	7150.0	45.590	mg/kg
CC43-000	0.0	0.4	Zinc	74.700	NA	307000.0	73.760	mg/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CC43-001	0.0	0.5	Aluminum	20600.000	NA	228000.0	16902.000	mg/kg
CC43-001	0.0	0.5	Beryllium	1.100	NA	521.0	0.962	mg/kg
CC43-001	0.0	0.5	Chromium	17.000	NA	268.0	16.990	mg/kg
CC43-001	0.0	0.5	Copper	19.000	NA	40900.0	18.060	mg/kg
CC43-001	0.0	0.5	Naphthalene	6.800	5.62	3090000.0	NA	ug/kg
CC43-001	0.0	0.5	Nickel	16.000	NA	204000.0	14.910	mg/kg
CC43-001	0.0	0.5	Xylene	15.500	11.2	2040000.0	NA	ug/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CC43-004	0.0	0.5	Arsenic	17.700	NA	22.2	10.090	mg/kg
CC43-004	0.0	0.5	Barium	801.000	NA	26400.0	141.260	mg/kg
CC43-004	0.0	0.5	Chromium	54.900	NA	268.0	16.990	mg/kg
CC43-004	0.0	0.5	Cobalt	12.700	NA	1550.0	10.910	mg/kg
CC43-004	0.0	0.5	Iron	41600.000	NA	307000.0	18037.000	mg/kg
CC43-004	0.0	0.5	Manganese	670.000	NA	3480.0	365.060	mg/kg
CC43-004	0.0	0.5	Nickel	59.800	NA	204000.0	14.910	mg/kg
CC43-004	0.0	0.5	Strontium	216.000	NA	613000.0	48.940	mg/kg
CC43-004	0.0	0.5	Uranium-235	0.198	NA	8.0	0.094	pCi/g
CC43-004	0.0	0.5	Vanadium	111.000	NA	7150.0	45.590	mg/kg
CC43-004	0.0	0.5	Zinc	86.100	NA	307000.0	73.760	mg/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-007	0.0	0.5	Cobalt	11.000	NA	1550.0	10.910	mg/kg
CD43-007	0.0	0.5	Copper	19.000	NA	40900.0	18.060	mg/kg
CD43-007	0.0	0.5	Uranium-235	0.160	NA	8.0	0.094	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-014	0.0	0.5	Copper	28.000	NA	40900.0	18.060	mg/kg
CD43-014	0.0	0.5	Uranium-234	4.668	NA	300.0	2.253	pCi/g
CD43-014	0.0	0.5	Uranium-235	0.171	NA	8.0	0.094	pCi/g
CD43-014	0.0	0.5	Uranium-238	4.668	NA	351.0	2.000	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CE43-002	0.0	0.5	Acetone	14.000	5.8	NA	NA	ug/kg
CE43-002	0.0	0.5	Aluminum	20000.000	NA	228000.0	16902.000	mg/kg
CE43-002	0.0	0.5	Barium	180.000	NA	26400.0	141.260	mg/kg
CE43-002	0.0	0.5	Beryllium	1.600	NA	521.0	0.962	mg/kg
CE43-002	0.0	0.5	Chromium	22.000	NA	268.0	16.990	mg/kg
CE43-002	0.0	0.5	Copper	27.000	NA	40900.0	18.060	mg/kg
CE43-002	0.0	0.5	Methylene chloride	2.000	1.7	2430000.0	NA	ug/kg
CE43-002	0.0	0.5	Nickel	57.000	NA	204000.0	14.910	mg/kg
CE43-002	0.0	0.5	Strontium	97.000	NA	613000.0	48.940	mg/kg
CE43-002	0.0	0.5	Uranium-235	0.174	NA	8.0	0.094	pCi/g
CE43-002	0.0	0.5	Vanadium	78.000	NA	7150.0	45.590	mg/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CE43-001	0.0	0.5	Uranium-235	0.128	NA	8.0	0.094	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CE43-003	0.0	0.5	Copper	19.000	NA	40900.0	18.060	mg/kg
CE43-003	0.0	0.5	Uranium-235	0.119	NA	8.0	0.094	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-016	0.0	0.5	Uranium-234	3.840	NA	300.0	2.253	pCi/g
CD43-016	0.0	0.5	Uranium-235	0.245	NA	8.0	0.094	pCi/g
CD43-016	0.0	0.5	Uranium-238	3.840	NA	351.0	2.000	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-005	0.0	0.5	Uranium-234	5.139	NA	300.0	2.253	pCi/g
CD43-005	0.0	0.5	Uranium-235	0.245	NA	8.0	0.094	pCi/g
CD43-005	0.0	0.5	Uranium-238	5.139	NA	351.0	2.000	pCi/g

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD43-017	0.0	0.5	Aluminum	22800.000	NA	228000.0	16902.000	mg/kg
CD43-017	0.0	0.5	Antimony	0.360	NA	409.0	0.470	mg/kg
CD43-017	0.0	0.5	Beryllium	0.962	NA	521.0	0.962	mg/kg
CD43-017	0.0	0.5	Chromium	26.000	NA	268.0	16.990	mg/kg
CD43-017	0.0	0.5	Cobalt	11.000	NA	1550.0	10.910	mg/kg
CD43-017	0.0	0.5	Iron	19000.000	NA	307000.0	18037.000	mg/kg
CD43-017	0.0	0.5	Lithium	13.000	NA	24400.0	11.250	mg/kg
CD43-017	0.0	0.5	Manganese	430.000	NA	3480.0	365.060	mg/kg
CD43-017	0.0	0.5	Nickel	25.000	NA	204000.0	14.910	mg/kg
CD43-017	0.0	0.5	Uranium-234	2.333	NA	300.0	2.253	pCi/g
CD43-017	0.0	0.5	Uranium-235	0.193	NA	8.0	0.094	pCi/g
CD43-017	0.0	0.5	Uranium-238	2.333	NA	351.0	2.000	pCi/g
CD43-017	0.0	0.5	Xylene	39.900	10.4	2040000.0	NA	ug/kg

Location	Sdepth_ft	Edepth_ft	Analyte	Result	RI	Wrw_al	Bg+2sd	Unit
CD44-001	0.0	0.5	Aluminum	17000.000	NA	228000.0	16902.000	mg/kg
CD44-001	0.0	0.5	Uranium-234	3.975	NA	300.0	2.253	pCi/g
CD44-001	0.0	0.5	Uranium-235	0.242	NA	8.0	0.094	pCi/g
CD44-001	0.0	0.5	Uranium-238	3.975	NA	351.0	2.000	pCi/g

KEY

- Surface soil sampling location with results above the WRW AL (Hot spot requiring remediation)
- Surface soil sampling location with results below WRW AL and above RL or background means plus two standard deviations
- UBC 559
- UBC 528
- PAC 500-902
- IHSS 159
- Paved Area
- Original Process Waste Line
- New Process Waste Line
- Dirt Road

Building

- Demolished
- Standing

N W E S

20 0 20 40 60 80 100 Feet

Scale = 1:800

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS

Prepared for: KAISER•HILL COMPANY

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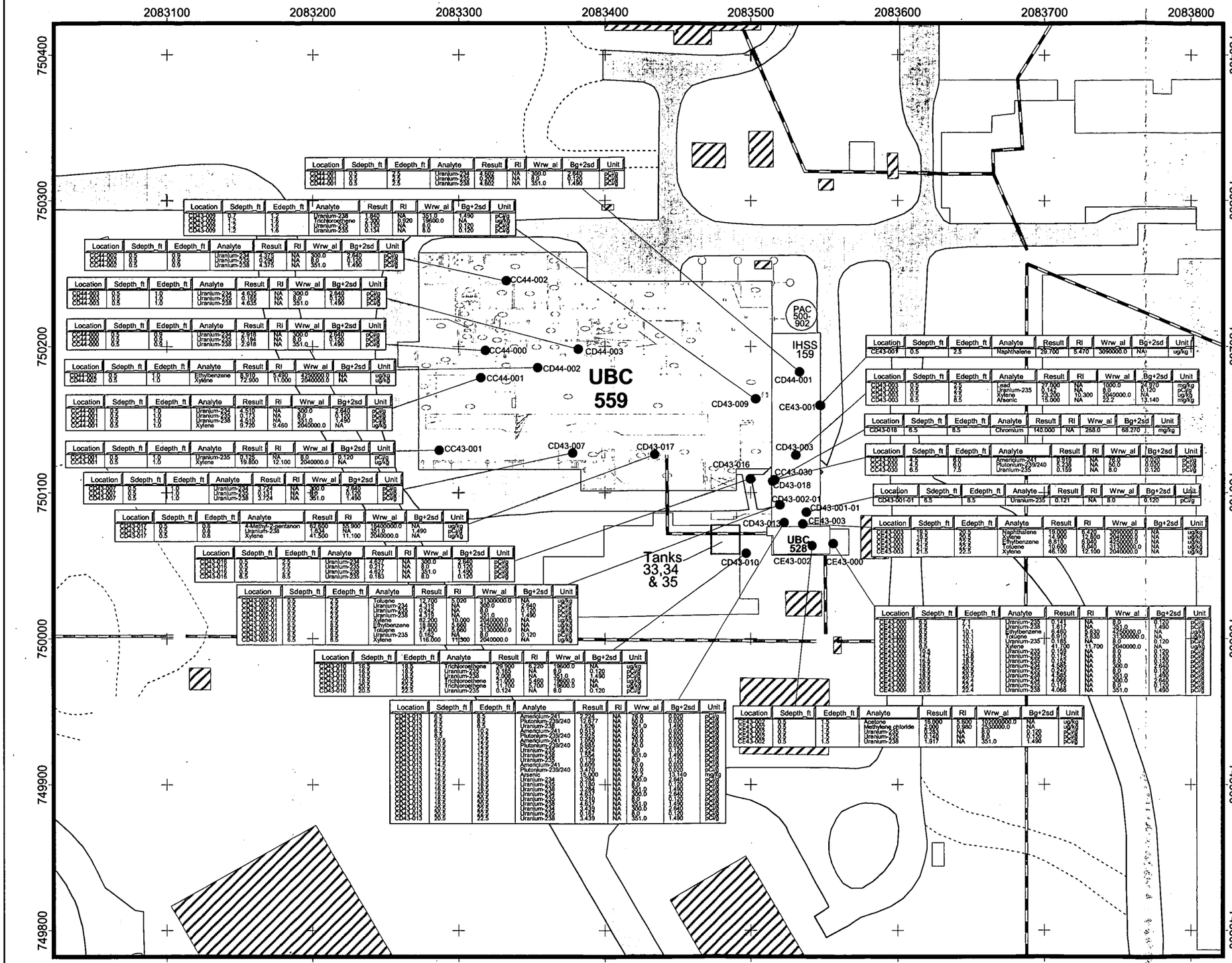
Figure 3
IHSS Group 500-3 Subsurface Soil Results Greater Than RLs or Background Means Plus Two Standard Deviations



KEY

- Surface soil sampling location with results below WRW AL and above RL or background means plus two standard deviations
- UBC 559
- UBC 528
- PAC 500-902
- IHSS 159
- Paved Area
- Original Process Waste Line
- New Process Waste Line
- Dirt Road

Building

- Demolished
- Standing

N
W E
S

20 0 20 40 60 80 100 Feet

Scale = 1:800

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS

Prepared for: KAISER•HILL COMPANY

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- Portions of IHSS 000-121, including Tanks T-7, T-33, T-34, and T-35.

This Notification concerns those portions of IHSS Group 500-3 requiring remediation as determined by the accelerated action soil data, namely, UBC 559 sampling location CD44-005, as well as other areas that may be identified during demolition activities. WRW AL exceedances for this location are listed in Table 2 and shown in Figure 2. IHSS Group 500-3 accelerated action results greater than RLs or background means plus two standard deviations are presented in Figures 2 and 3. The planned 0.5- to 2.5-foot (ft) below ground surface (bgs) sample at CD44-005 was not collected because readings of 3000 to 30,000 counts per minute were recorded on field instruments during collection of the 0.0 to 0.5 ft bgs sample and continued sampling would likely have spread contamination in the building. Therefore the depth of the exceedance at this location is uncertain.

Table 2
WRW AL Exceedances in IHSS Group 500-3

Sample Location	Sample Starting Depth (ft)	Sample Ending Depth (ft)	Analyte	Result	WRW AL	Unit
CD44-005	0.0	0.5	Americium-241	1200.000	76.0	pCi/g
			Plutonium-239/240	8130.000	50.0	pCi/g

2.1 Project Conditions

The following conditions are present within IHSS Group 500-3:

- UBC 559 consists of the Building 559 slab and associated structures. Building 559, the Service Analytical Laboratory, is an approximately 35,000 ft^2 building formerly used as a laboratory. An approximately 12-ft-wide by 200-ft-long tunnel runs beneath the building in an east-west direction. A north-south tunnel approximately 13 ft wide and 30 ft long connects the southeast portion of Building 559 with the northeast portion of Building 561, which houses filter plenums for Building 559. Transite air ducts are present beneath the Building 559 slab (reference RFETS Drawing 39410-105 M). Original Process Waste Lines (OPWL) are present in the tunnels as well as in other areas of the building. New Process Waste Lines (NPWL) are also present but are less extensive. The hot spot indicated in Figure 2 is beneath the building slab.

- Tank 7, Process Waste Pit, is located within Building 528. Tank 7 consists of two 2,000-gallon in-sump steel tanks that once held process waste.

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- IHSS 500-159, Radioactive Site Building 559, is a 5,400 ft^2 area east of Building 559 where radioactive soil associated with OPWL breaks was previously excavated and removed.

- Tanks 33, 34, and 35 were determined upon investigation to be a single tank in the northeastern corner of Building 561. According to the current Waste Stream and Residue Identification and Characterization Report Building Book for Building 561, the function of the tank was to hold deluge water in case of a plenum fire in any of the four plenums housed in Building 561. Because this event did not occur, the tank was reportedly never used (DOE 2004b).

2.2 RFCA SSRS Evaluation

An SSRS is performed when nonradionuclides and uranium are present in the soil deeper than 6 inches bgs, and when americium or plutonium is present deeper than 3 ft bgs. Current site conditions are evaluated by the SSRS to determine whether remediation is required. Any accelerated actions taken, confirmation sampling results, and a revised SSRS will be documented in the IHSS Group 500-3 Closeout Report.

Screen 1 – Are contaminant of concern (COC) concentrations below WRW Soil Action Levels?

No. Plutonium and americium have been detected at activities of 8130 picocuries per gram (pCi/g) and 1200 pCi/g, respectively in a sample collected beneath the slab of Building 559 at location CD44-005 (see Figure 2) at a depth interval of 0 to 0.5 ft below the slab. Although a 0.5 to 2.5 ft sample was proposed for this location, it was not collected because readings of 3000 to 30,000 counts per minute were recorded on field instruments during collection of the 0.0 to 0.5 ft bgs sample, and efforts to collect the deeper sample were abandoned because of the potential to spread contamination.

Screen 2 – Is there a potential for subsurface soil to become surface soil (landslide and erosion areas identified on Figure 1)?

No. IHSS Group 500-3 is not located in an area subject to erosion and landslides in accordance with Attachment 5 Figure 1 of RFCA (DOE et al. 2003).

Screen 3 – Does subsurface soil radiological contamination exceed criteria defined in Section 5.3 and Attachment 14?

Based on pre-accelerated action data and accelerated action data collected to date, subsurface soil radionuclide contamination does not exceed RFCA WRW ALs (RFCA Section 5.3; DOE et al. 2003). However, IASAP Addendum #IA-03-12 called for a subsurface soil (0.5-2.5 ft bgs) sample to be collected at CD44-005. It was not collected because continued sampling at this location would likely have spread contamination in the building. Although it was not sampled, it is probable that subsurface soil at CD44-005 does contain radiological contamination in excess of the WRW AL.

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Screen 4 – Is there an environmental pathway and sufficient quantity of COCs that would cause an exceedance of the surface water standards?

Radionuclide-contaminated surface soil is present beneath the Building 559 slab and radionuclide- and volatile organic compound (VOC)-contaminated groundwater is present beneath IHSS Group 500-3. The depth of subsurface contamination present at CD44-005 is uncertain because no samples were collected deeper than 0.5 ft beneath the slab. No VOC sources have been identified in IHSS Group 500-3 based on accelerated action soil data, therefore this section focuses primarily on radionuclide contamination. Contaminant migration in surface water due to erosion and advective transport by groundwater are the two possible pathways whereby radionuclides originating in IHSS Group 500-3 could enter surface water. Both potential pathways are discussed below.

Very little of the IA is highly erodible (per RFCA Attachment 5, Figure 1), yet surface water impacts from broad areas of the IA are still present. Although erosion-prone areas contribute greater volumes of sediment to surface water than other areas, areas of relatively low erosion can still be contaminant sources. IHSS Group 500-3 occupies a relatively flat alluvial terrace that is not considered highly erodible (RFCA Attachment 5, Figure 1). Drainage from the northeastern corner of Building 559 flows into the South Walnut Creek drainage, while runoff from the remainder of the area flows into Walnut Creek. The nearest Point of Evaluation (POE) on South Walnut Creek is GS10 and the nearest POE on Walnut Creek is SW093. These specific locations are shown in Figure 4 along with drainage patterns and topography.

Since 1997, water quality samples collected at GS10 have had an annual seasonal pattern of springtime exceedances of the 0.15 picocurie per liter (pCi/L) RFCA standard for plutonium and the 0.15 pCi/L RFCA standard for americium. A number of source evaluations have been conducted from 1997 through 2004. No single source of the plutonium and americium detected at GS10 has been identified. However, since the exceedences seen at GS10 have not been detected at GS40, the majority of the plutonium and americium loading to South Walnut Creek appears to occur between surface water stations GS40 and GS10, shown in Figure 4 (DOE 2003b). IHSS Group 500-3 is not located in this area and is therefore not likely to be one of the major sources.

As shown in Figure 4, the GS10 drainage basin overlaps with the westernmost portion of the 903 Pad area. Extensive soil excavation took place in the 903 Pad and Lip area between December 2003 and September 2004. Downgradient increases in plutonium and americium loading in surface water occurred in association with these activities. Stabilization of the excavated areas by regarding and revegetation should reduce sediment loading in downgradient areas, and removal of the actinide source from the area should substantially mitigate future impacts of the 903 Pad and Lip areas to downgradient surface water locations including GS10.

Water quality data for SW093 are consistently below the RFCA standards for metals and uranium. Plutonium activities are typically below RFCA standards, however there were episodes in spring/summer 1999 and spring 2003 in which the 30-day average plutonium activity at this location exceeded the RFCA standard for surface water. Source evaluations indicated that Building 559 was one of several potential sources, along with

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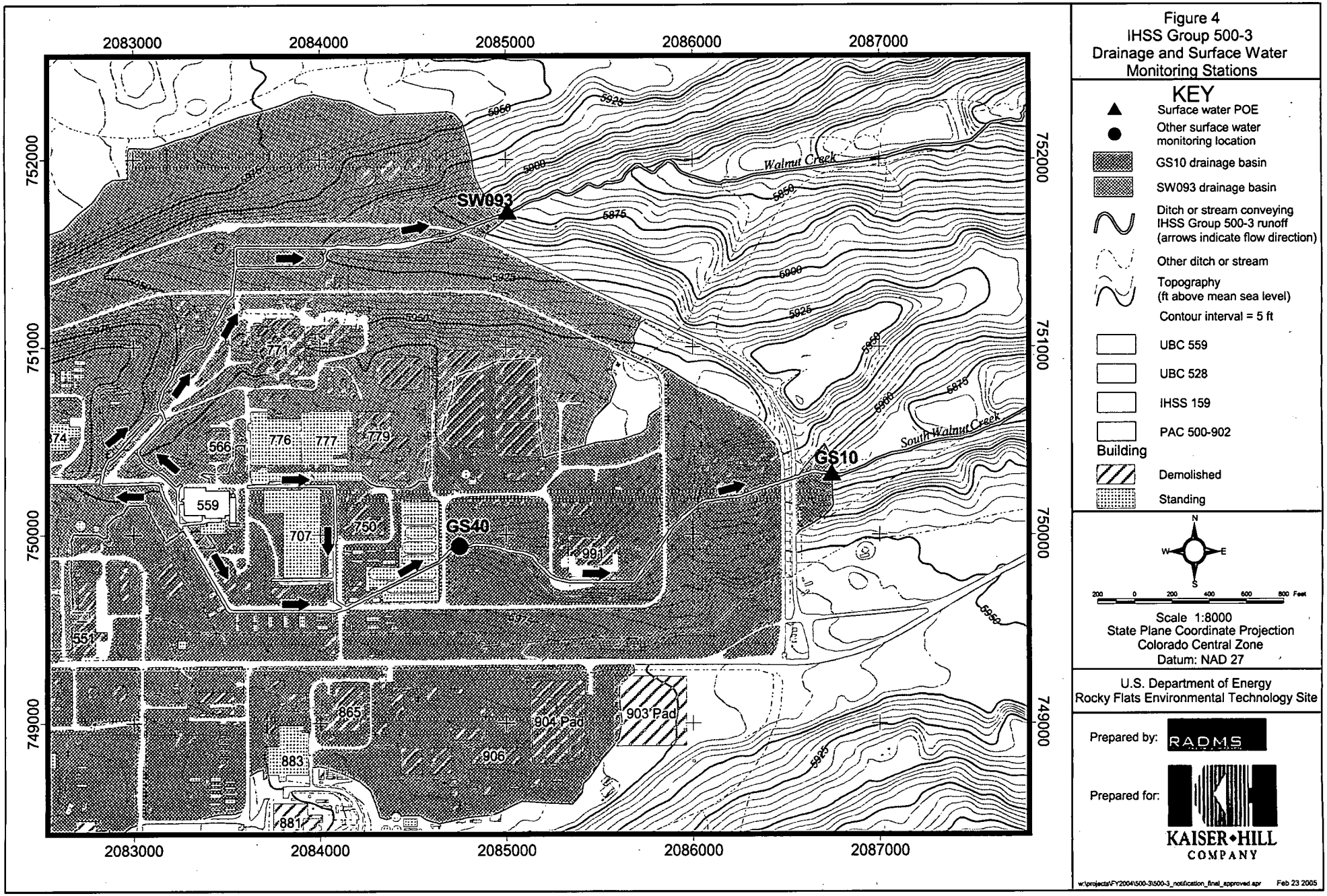

Figure 4
IHSS Group 500-3
Drainage and Surface Water
Monitoring Stations

KEY

- Surface water POE
- Other surface water monitoring location
- GS10 drainage basin
- SW093 drainage basin
- Ditch or stream conveying IHSS Group 500-3 runoff (arrows indicate flow direction)
- Other ditch or stream
- Topography (ft above mean sea level)
- Contour interval = 5 ft
- UBC 559
- UBC 528
- IHSS 159
- PAC 500-902

Building

- Demolished
- Standing

N
W E
S

200 0 200 400 600 800 Feet

Scale 1:8000
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD 27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: RADMS

Prepared for: KAISER•HILL COMPANY

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Buildings 771/774, 776/777, and 371/374 (DOE 2003b). In mid-2004, an increase in suspended solids along with plutonium and americium loading observed at SW093 was attributed to increased erosion due to Site closure activities in the upstream area. As a result, source evaluations are ongoing and some erosion controls have been put into place (DOE 2004c). During accelerated action activities at IHSS Group 500-3, best management practices (BMP) will be employed to minimize the possibility of erosional impact to surface water. Once accelerated action at this IHSS Group is complete, the ground surface will be reconfigured and appropriate erosion controls will be incorporated into the final land surface. Surface water quality monitoring will continue to ensure the long-term effectiveness of the accelerated action for protecting surface water.

In order to evaluate potential for advective groundwater transport of IHSS Group 500-3 soil contamination, groundwater data were reviewed for 15 wells in the vicinity of IHSS Group 500-3. Integrated Monitoring Program (IMP) potentiometric surface maps covering the IHSS Group 500-3 area indicate that groundwater into the area from the southwest and flows away from the area toward both the east and northwest. Based on this configuration, monitoring wells P114689, 56201, and 56301 are upgradient of IHSS Group 500-3 and monitoring wells 21698, 21798, 22896, 55901, 56001, 56101, 60399, and 60499 are downgradient. Monitoring wells 21898, 60599, 60199, and 60299 are in the vicinity of IHSS Group 500-3 and are considered to be crossgradient. Table 3 summarizes americium and plutonium activities measured in groundwater samples from

Table 3
Plutonium and Americium Results for IHSS Group 500-3 Groundwater

Analyte	Number of Analyses	Detection Frequency	Max Result	Average Result	unit	*Percent of Results Exceeding:* Background Mean +2SD	RFCA Tier 2 Groundwater AL	RFCA Tier 1 Groundwater AL
Upgradient Wells:								
Americium-241 (dissolved)	6	50%	0.0050	0.0038	pCi/L	0%	0%	0%
Americium-241 (total)	19	68%	0.024	0.0079	pCi/L	0%	0%	0%
Plutonium-239/240 (dissolved)	7	29%	0.00063	0.00032	pCi/L	0%	0%	0%
Plutonium-239/240 (total)	20	45%	0.036	0.0053	pCi/L	0%	0%	0%
Downgradient Wells:								
Americium-241 (total)	27	52%	0.058	0.015	pCi/L	4%	0%	0%
Plutonium-239/240 (total)	27	15%	0.028	0.020	pCi/L	0%	0%	0%
Crossgradient Wells:								
Americium-241 (total)	3	33%	0.0085	0.0085	pCi/L	0%	0%	0%
Plutonium-239/240 (total)	3	67%	0.018	0.013	pCi/L	0%	0%	0%

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these wells. There were no exceedences of RFCA groundwater ALs for either americium or plutonium. Americium was detected in one downgradient sample at a concentration exceeding the background mean plus two standard deviations. Plutonium activities did not exceed background in any of the samples. Based on this data, groundwater does not appear to be an active pathway for radionuclide transport in IHSS Group 500-3.

Analytes that have been detected above RFCA groundwater ALs in the IHSS Group 500-3 area include cadmium, chromium, nickel, 1,1-dichloroethene, tetrachloroethene, and trichloroethene. As discussed below, accelerated action soil data do not indicate sources of these contaminants in IHSS Group 500-3 (Figures 2 and 3).

Cadmium was not detected above the background mean plus two standard deviations in surface or subsurface soil in IHSS Group 500-3. In surface soil there were nine detections each of chromium and nickel that exceeded background means plus two standard deviations, but in both cases, the four highest were B-qualified. The highest detections that were not B-qualified were less than twice the background mean plus two standard deviations. These levels are not suggestive of a significant contaminant source area. Neither 1,1-dichloroethene nor tetrachloroethene were detected in surface soil or subsurface soil in IHSS Group 500-3. Trichloroethene was detected in four samples at concentrations ranging from 2.3 to 29.9 µg/kg. Three of the four samples were collected in the subsurface east of Building 561. TCE does not appear to be present in sufficient quantity in this area to account for the 1000+ µg/L TCE concentrations observed in downgradient groundwater.

2.3 Remediation Plan

This ER RSOP Notification remediation plan for IHSS Group 500-3 includes the following objectives. All objectives will be accomplished in consultation with CDPHE and will conform to the ER RSOP (DOE 2004a) and Facility Disposition RSOP (DOE 2004d) as applicable.

- Remove portions of the Building 559 slab and associated tunnels (the 200-ft-long east-west tunnel as well as the tunnel connecting to Building 561) as necessary to remove the facility to at least 3 ft below final grade and agreed to through consultation with CDPHE.

- Remove asbestos-containing materials (i.e., transite) encountered during slab removal. Dispose appropriately based on waste characterization results.

- Remove foundation, sanitary, and storm drains within 3 ft of final grade.

- Remove OPWL drains and piping within 3 ft of the final grade in accordance with ER RSOP Notification #03-14 (DOE 2003d) and RFCA Attachment 14 (DOE et al. 2003). Remove any OPWL piping and associated soil found during slab removal. OPWL piping that is deeper than 3 ft below the final grade will be disrupted, drained, and grouted.

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- To address contamination detected at CD44-005 and any other contamination found during slab removal, remove soil with plutonium or americium activities greater than the RFCA WRW AL to a depth of 3 ft bgs or to the applicable AL, whichever comes first. (The depth of the exceedance detected in the 0- to 0.5-ft bgs sample from CD44-005 is uncertain because underlying soil was not sampled.) If activities are greater than 3 nanocuries per gram (nCi/g) between 3 and 6 ft bgs, characterize and remediate in accordance with RFCA Attachment 5 (DOE et al. 2003). If plutonium or americium is present deeper than 6 ft at activities greater than the RFCA WRW AL, conduct an SSRS.

- Where contaminated soil is removed, collect confirmation soil samples in accordance with the IA and Buffer Zone (BZ) SAP (IABZSAP)(DOE 2004e). At a minimum, excavations smaller than 0.06 acre will require five confirmation samples: one from the bottom of the excavation and four from the sidewalls.

It is anticipated that after remediation there may be areas with concentrations of metals, radionuclides, and organics greater than background means plus two standard deviations, or method detection limits (MDLs) or reporting limits (RLs), but below RFCA WRW ALs.

2.4 Stewardship Evaluation

Because the full extent of excavation and remediation is not known at this time, an additional stewardship evaluation will be conducted during remediation using the consultative process; this will be documented in the IHSS Group 500-3 Closeout Report. A map will be provided showing the remediated areas and a new map of residual contamination will be generated after remediation.

The following sections present the stewardship evaluation.

2.4.1 Proximity to Other Contaminant Sources

IHSS Group 500-3 is located in an area with numerous other contaminant sources. IHSS Group 500-6, a contaminated wastewater spill site, is directly south of IHSS Group 500-3. IHSS Group 500-1, which includes metal and chemical storage sites as well as Valve Vaults 11, 12, and 13, is located west of IHSS Group 500-3. Directly east of IHSS Group 500-3 are portions of IHSS Group 000-2, which includes OPWL piping, tanks, and leaks. Northeast of IHSS Group 500-3 is IHSS Group 700-3, which includes UBCs 776, 777, 778, and 701, as well as a variety of associated IHSSs, PACs, and tanks.

2.4.2 Surface Water Protection

Surface water protection includes the following considerations:

Is there a pathway to surface water from potential erosion to streams or drainages?

Both natural drainage and the storm drain system convey runoff from IHSS Group 500-3 into the Walnut Creek and South Walnut Creek drainages. IHSS Group 500-3 is not an area of high erosion as established by RFCA Attachment 5 Figure 1. Best management

practices (BMP) should be employed during accelerated action to minimize erosion caused by land disturbance. When accelerated action is complete, IHSS Group 500-3 should be regraded and erosion controls should be incorporated into the final land surface configuration as needed to prevent erosion.

Do characterization data indicate there are contaminants in surface soil?

Yes. Plutonium-239/240 and americium-241 have been detected at activities of 8,130 and 1,200 picocuries per gram (pCi/g), respectively, in a sample collected at a depth of 0 to 0.5 ft beneath the slab of Building 559.

Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?

Yes. Monitoring results from POEs GS10 and SW093 indicate that contamination in surface water downgradient from IHSS Group 500-3 is consistent with surface soil contamination detected in IHSS Group 500-3 and that IHSS Group 500-3 is a potential source.

Seasonal exceedances of both the 0.15 pCi/L RFCA surface water standard for plutonium and the 0.15 pCi/L RFCA surface water standard for americium have been routinely observed at GS10 in the springtime. A number of source evaluations conducted from 1997 through 2004 did not identify a single source of the contaminants detected at GS10, but concluded that a majority of the plutonium and americium loading to South Walnut Creek occurs between surface water stations GS40 and GS10, shown in Figure 4 (DOE 2003b). Although IHSS Group 500-3 is not located in this area, it is evident from the soil exceedances at CD44-005 that plutonium and americium were released beneath this portion of Building 559. It is not likely that contaminated soil at this specific location could have significantly impacted surface water in the past because the Building 559 slab has isolated the affected soil from contact with precipitation and surface water.

As shown in Figure 4, the GS10 drainage basin overlaps with the westernmost portion of the 903 Pad area. Extensive soil excavation took place in the 903 Pad and Lip area between December 2003 and September 2004. Downgradient increases in plutonium and americium loading in surface water occurred in association with these activities. Stabilization of the excavated areas by regarding and revegetation will reduce sediment loading in downgradient areas, and removal of the actinide source from the area will substantially mitigate future impacts of the 903 Pad and Lip areas to downgradient surface water locations including GS10.

Water quality data for SW093 are consistently below the RFCA surface water standards for metals and uranium. Plutonium activities are typically below RFCA surface water standards, but there were periods in 1999 and 2003 when the 30-day average plutonium activity at this location exceeded the standard for surface water. A source evaluation indicated that Building 559 was one of several potential sources, along with Buildings 771/774, 776/777, and 371/374 (DOE 2003b).

In mid-2004, an increase in suspended solids along with plutonium and americium loading observed at SW093 was attributed to increased erosion due to site closure

activities in the upstream area. As a result, source evaluations are ongoing and some erosion controls have been put into place (DOE 2004c). During accelerated action activities at IHSS Group 500-3, BMP will be employed to minimize the possibility of increased erosion to surface water. Once accelerated action at this IHSS Group is complete, the ground surface will be reconfigured to minimize erosion potential. Surface water quality monitoring will continue to ensure the long-term effectiveness of the accelerated action for protecting surface water.

Is the IHSS Group in an area with high erosion potential?

IHSS Group 500-3 is not located in an area subject to erosion in accordance with Attachment 5 Figure 1 of RFCA Attachment 5 (DOE et al. 2003). During accelerated action activities at IHSS Group 500-3, BMP will be employed to minimize the possibility of increased erosion to surface water. Once accelerated action at this IHSS Group is complete, the ground surface will be reconfigured with appropriate erosion controls. Surface water quality monitoring will continue to ensure the long-term effectiveness of the accelerated action for protecting surface water.

2.4.3 Monitoring

Monitoring includes the following considerations:

Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?

No. To evaluate possible groundwater impacts from IHSS Group 500-3, groundwater data from 15 wells in the area were reviewed. IMP potentiometric surface maps for the IHSS Group 500-3 area indicate that groundwater flows into the area from the southwest and flows away from the area toward both the east and the northwest. Based on this configuration, monitoring wells P114689, 56201, and 56301 are upgradient of IHSS Group 550-3 and monitoring wells 21698, 21798, 22896, 55901, 56001, 56101, 60399, and 60499 are downgradient. Monitoring wells 21898, 60599, 60199, and 60299 are in the vicinity of IHSS Group 500-3, but are neither upgradient nor downgradient. These wells are considered to be crossgradient. Table 3 summarizes americium and plutonium activities measured in groundwater samples from these wells. There were no exceedences of RCRA groundwater ALs for either americium or plutonium. Americium was detected in one downgradient sample at a concentration exceeding the background mean plus two standard deviations. Plutonium activities did not exceed background in any of the samples. Based on this data, it does not appear that there are groundwater impacts from IHSS Group 500-3.

Can the impact be traced to a specific IHSS Group?

No. The main soil contaminants identified in IHSS Group 500-3 were americium and plutonium. As explained above, these contaminants do not appear to be impacting groundwater. Analytes that have been detected above RFCA groundwater ALs in the IHSS Group 500-3 area include cadmium, chromium, nickel, 1,1-dichloroethene, tetrachloroethene, and trichloroethene. As discussed below, accelerated action soil data do not indicate sources of these contaminants in IHSS Group 500-3 (Figures 2 and 3).

Cadmium was not detected above the background mean plus two standard deviations in surface or subsurface soil in IHSS Group 500-3. In surface soil there were nine detections each of chromium and nickel that exceeded background means plus two standard deviations, but in both cases, the four highest were B-qualified. The highest detections that were not B-qualified were less than twice the background mean plus two standard deviations. These levels are not suggestive of a significant contaminant source area. Neither 1,1-dichloroethene nor tetrachloroethene were detected in surface soil or subsurface soil in IHSS Group 500-3. Trichloroethene was detected in four samples at concentrations ranging from 2.3 to 29.9 µg/kg. Three of the four samples were collected in the subsurface east of Building 561. TCE does not appear to be present in sufficient quantity in this area to account for the 1000+ µg/L TCE concentrations observed in downgradient groundwater.

In summary groundwater contamination observed in the IHSS Group 500-3 area is not traceable to IHSS Group 500-3. It is uncertain which, if any, IHSS Groups the observed contamination may be associated with.

Are additional monitoring stations needed?

Not applicable at this time. The need for and placement of monitoring stations will be re-evaluated in the Long-Term Stewardship Plan.

Can existing monitoring locations be deleted if additional remediation is conducted?

Not applicable at this time. Existing wells monitor contamination from areas within and outside IHSS Group 500-3.

2.4.4 Stewardship Actions and Recommendations

The current stewardship actions and recommendations for IHSS Group 500-3 are as follows:

- Use BMPs to reduce erosion into surface water drainage.
- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following:
  - Restrict access; and
  - Control soil excavations through the Site Soil Disturbance Permit process.
- Implement long-term stewardship actions, including the following:
  - Prohibitions on construction of buildings in the area;
  - Restrictions on excavations or other soil disturbances; and
  - Prohibitions on groundwater pumping in the area of IHSS Group 500-3.

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions.

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2.5 Accelerated Action Remediation Goals

ER RSOP remedial action objectives (RAOs) include the following:

- Provide a remedy consistent with the RFETS goal of protection of human health and the environment;
- Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and
- Minimize the spread of contaminants during implementation of accelerated actions.

2.6 Treatment

Not applicable.

2.7 RCRA Units and Intended Waste Disposition

Not applicable.

2.8 Administrative Record Documents

DOE, 1992-2003, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003, Industrial Area Sampling and Analysis Plan Addendum #IA-03-12, IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation FY03 Notification #03-14, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2004, RFCA Standard Operating Protocol for Facility Disposition, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

2.9 Projected Schedule

Remediation of IHSS Group 500-3 is expected to begin in the second quarter of FY05.

3.0 PUBLIC PARTICIPATION

ER RSOP Notification #05-02 activities will be discussed at the January 2005 ER/Decontamination and Decommissioning (D&D) Status meeting. A Portable Document Format (pdf) version of this Notification was provided to the local governments. This Notification is available at the Rocky Flats Reading Rooms and on the Environmental Data Dynamic Information Exchange (EDDIE) Website at www.rfets.gov/eddie/

4.0 REFERENCES

Department of Energy (DOE), 1992-2003, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002, Actinide Migration Evaluation Pathway Analysis Report Technical Analysis, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2003a, Industrial Area Sampling and Analysis Plan Addendum #IA-03-12, IHSS Group 500-3, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2003b, Final Automated Surface Water Monitoring Report Water Year 2001, Rocky Flats Environmental Technology Site, Golden, Colorado, May.

DOE, 2003c, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2003d, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, FY03 Notification #03-14, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003e, Integrated Monitoring Plan, FY 2003 Background Document, Rocky Flats Environmental Technology Site, Golden, Colorado, April.

DOE, 2004a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Modification 2, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

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DOE, 2004b, Waste Stream and Residue Identification and Characterization Building Book, Building 561, Version 7.0, Rocky Flats Environmental Technology Site, Golden, Colorado, August.

DOE, 2004c, Closeout Report for IHSS Group 700-7, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2004d, RFCA Standard Operating Protocol for Facility Disposition, Rocky Flats Environmental Technology Site, Golden, Colorado, March.

DOE, 2004e, Industrial Area and Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado.

DOE, CDPHE, and EPA, 2003, Modifications to the Rocky Flats Cleanup Agreement Attachment, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, Golden, Colorado, June.